PROJECT NUMBER: 2108
PROJECT TITLE: New Product and Filter Technology
PROJECT LEADER: W. T. Callaham
PERIOD COVERED: May, 1990

I. SAUNA

A. **Objective:** Develop products to compete against Barclay utilizing a novel filter system.

B. **Status:** Three prototypes for the GCC area (4mg tar) were subjectively evaluated by Flavor Development versus a Saudi Barclay. Two models (dual concentric & 1.6/41000 CA; and mono paper) achieved parity while the third model (dual SCS-III & 1.6/41000) was preferred. Three earlier prototypes were remade to adjust deliveries and are currently being analyzed. These have filter systems of dual concentric & carbon-on-1.6/41000 CA, dual 1.6/41000 CA & paper, and dual Astra & 1.6/41000 CA. The best candidates will be forwarded to EEMA for evaluation.

Also, two models for Japan (5mg tar) were subjectively evaluated versus a Japanese Barclay and both were preferred. These had filter systems of dual concentric & carbon-on-1.6/41000 CA; and dual SCS-III & carbon-on-2.6/42000 CA. These have been submitted to Japan Product Development for evaluation.

C. **Plans:** 1. Finalize construction of the GCC model submit for EEMA approval.
2. Finalize construction of the Japanese model and test on Danchi panel.

II. ASH TRAY ODOR

A. **Objective:** Develop products which facilitate the elimination of ash tray odor.

B. **Status:** As a result of encouragement over the most recently produced odor-less ash tray, fabrication was begun by an outside machine shop for additional models. Delivery is expected by early June.

C. **Plans:** Complete fabrication of additional models.

III. MENTHOLATION TECHNOLOGY

A. **Objective:** To develop alternative mentholation techniques which offer a product or processing advantage.

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B. **Status:** A six-week aging study was completed of cigarettes mentholated via PG/menthol-on-foil (20%/80%). Menthol-in-smoke levels remained at approximately 0.5mg throughout the test period. Equilibration between the inner and outer cigarettes took approximately 3 to 4 weeks. Subjectively, only minor differences were noted from the control MOF model. SOLVIC spotting analysis after 6 weeks indicated more than twice as many spots for the test cigarettes as for the control. A similar trial is in progress with cigarettes mentholated via slightly different solutions to address the above concerns. These solutions are 25% PG/75% menthol and 15% PG/80% menthol/5% ethanol.

A brief factory trial (limited due to production requirements) of pre-embossed 30-lb mentholated foil was conducted in Louisville to demonstrate machinability. Marlboro Lights 100 cigarettes were packed without any foil curling or breakage. Another trial has been requested for more extensive sampling.

Analysis of a menthol/β-cyclodextrin complex prepared in-house indicated a menthol content of 9.7% versus 8.8% for a similarly prepared vendor sample. Product applications are currently being pursued.

A meeting was held with Engineering to review the results of the mentholated insert study and to request further economic evaluation.

A study was initiated as a result of work done by Eastman on improved menthol stability using unplasticized filters.

C. **Plans:** 1. Complete a factory trial of foil embossing prior to mentholation.
2. Complete the menthol/PG-on-foil study.
3. Continue development of an encapsulated menthol.
4. Complete a study of acidified filters on menthol response.
5. Complete the unplasticized filter study.

IV. WEB-TYPE FILTER MATERIALS

A. **Objective:** To characterize web-type filter materials and develop subjectively acceptable products with them.

B. **Status:**

Paper Filters: MF Lights Menthol 100 models were prepared with mentholated paper filters and submitted to CTSD for analysis as part of a study to investigate their subjective and menthol delivery performance.

A process/product comparison of our web filter maker and Intertaba's filter maker was completed . All data from this study is being summarized and a report being written.

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Two bobbins of Tela crepe paper were received with 2% and 20% creping levels. The materials were evaluated to determine the effect of creping on filter quality and web runnability. Both materials ran well, however, different machine conditions were required for the two materials. The creping appears to allow more flexibility in runnability which would be very important for high speed filter making.

A filter tip RTD gain study was completed. RTD increases were not observed as previously seen between web filter rods and finished filter tips. The study will be replicated on different equipment.

PM Web: Sample webs were produced at the University of Maine using 75% 1/8" cut CA staple and 25% softwood fiber. Various refining levels were evaluated and CMC and PVA binders were used to improve elongation. Creping of the web at two different machine positions was unsuccessful. The sample bobbins are currently being evaluated for filter making machinability and cigarettes will be produced for analytical and subjective evaluation.

Paper/Pulp Acetylation: Filter rods were handmade from hand sheets comprised of 75% acetylated wood pulp + 25% softwood pulp. In addition, filter rods were machine made from a 30 ft. sample of acetylated cellulose web from Physical Research. These two acetylated cellulose filter models are being put into cigarette models for preliminary subjective screening.

CA Web: Samples of the most recent Kimberly-Clark produced CA Web is currently being characterized.

A corrugation correlation study was conducted with Celanese using "sister" bobbins. Data is currently being analyzed.

Sample filters of Dexter produced CA Web were received from Celanese for analytical and subjective characterization. One model has a modified recipe containing 10% cellulose in place of CA staple.

C. Plans: 1. Complete paper filter additives testing.
2. Complete mentholated filter study.
3. Continue development of PM web, acetylated paper, and coated papers.
4. Complete the evaluation of Celanese CA web.
5. Investigate polymeric webs.
6. Complete the filter tip RTD gain study.

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IV. NOVEL VENDOR FILTERS

A. Objective: To investigate vendor filters and filter materials for potential applications where increased efficiency, taste response or a novelty is needed.

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B. **Status:**

Concentric Filters: Mega look-a-like test (concentric) and control (CA mono) models were made with MFUL filler and subjectively evaluated by Flavor Development. The control had slightly increased impact and was more peppery than the test. FTR-produced Mega cigarettes with CA mono and concentric filters are currently being tested.

Rhodia Supercrimp Filters: Subjective evaluation of Rhodia 2.1/25000 supercrimp CA tow by Flavor Development personnel indicated no difference from FT-107 or FT-222 at equal RTD and delivery. This tow item allows for approximately 25mg per filter tip weight reduction over the above controls. A final report is being prepared.

Three different filter systems are currently being evaluated as part of a smoke presentation study. The filters are an SCS-III, Astra and CA control.

Project 605 models with SCS-III filters, hole-in and hole-out, were subjectively evaluated by Flavor Development. The SCS filter with the hole toward the smoker imparts a higher impact while holding filtration efficiency constant.

C. **Plans:** 1. Complete evaluation of the Mega filter.
2. Complete the smoke presentation study.
3. Provide specialty filters to others as requested.
4. Complete a study of MPF filters.
5. Complete the dual cambridge pad holder evaluation.

V. PRODUCT DEVELOPMENT SUPPORT

A. **Objective:** To provide cigarette/filter design, modelling and testing support for major new product development programs.

B. **Status:**

Ambrosia: Samples of entrapped vanillin were prepared for testing by Flavor Development. One sample contained about 10% in β-cyclodextrin and the other contained about 50% in Ca-adipate.

Best of the Lowest: A request has been submitted to semi-works for a 1mg BOLD model using a dual UHF/CA filter (18/9mm configuration).

A request was submitted for 1mg BOLD cigarettes using recessed end filters.

Concentric filters for a 1mg Bold model were designed and are being made by Filtrona. These concentrics have either a paper core or paper periphery in parallel

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with 1.6/41000 tow. SCS-III filters for a 100mm version have also been designed and ordered.

Machinery Development: A modified ESP machine for Superslims papers was received and is being installed in the Filter Development Lab.

C. **Plans:** 1. Continue development for new products as required.
2. Complete ESP unit installation.

VI. CARBON STUDIES

A. **Objective:** Conduct fundamental studies of carbons and carbon filtered cigarettes to better understand their performance.

B. **Status:** Analytical Research, using TGA methods, completed a study of our carbons types taken from Lark Milds, PM Lights and Parliament 100's cigarettes at several aging intervals. The data indicate that the carbon in all three carbon cigarettes is absorbing propylene glycol and triacetin. The rate and amount absorbed varies among the three filter/carbon types. This data will be used to fingerprint the performance of the carbons for comparisons to new carbons.

Variability characterization of our three production carbons is in progress. Carbon tetrachloride activity testing was completed by Envirotrol and sieve/moisture testing is being completed by Incoming Materials QA.

Work has been initiated on identifying and characterizing competitive product carbons. Carbon was taken from Cabin Milds filters and forwarded to Analytical Research for determination of particle size and metal content.

C. **Plans:** 1. Complete the coal vs. coconut study.
2. Evaluate the effect of carbon OV, sieve size, and activity on subjective response and recommend the optimal combination.
3. Complete the evaluation of incoming carbon variability.

VII. ALTERNATIVE PLASTICIZERS

A. **Objective:** Qualify alternative plasticizers which offer a product advantage.

B. **Status:** Subjective evaluations by a Flavor Development Panel were completed on PM Super Lights made with triacetin (control) and triethyl citrate (test) plasticizers. Carbon loadings of 40 and 52 mg were used. Overall, minimal differences were observed between the control and the test samples.

C. **Plans:** 1. Complete testing as planned and continue investigations of other plasticizers.

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